British Hernia Society (BHS) - Unwarranted Variation Scenario:
Getting the Complex Abdominal Wall Repair Pathway Right

Angela's story:

Complex Abdominal Wall Repair (CAWR)

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Foreword from John Abercrombie

In England we spend over £40M p.a. on incisional hernias, it is clear from our interviews with surgeons that all is not well and that significant improvements can be made both in terms of patient care and economic savings when it comes to Complex Abdominal Wall Repair (CAWR).

Getting It Right First Time (GIRFT) is a major quality improvement initiative and within general surgery, CAWR is an intervention that would significantly benefit from improvements in its care pathway leading to improved outcomes for this patient cohort.

In general surgery, we have seen wide variations in the way in which services are delivered and in the outcomes they produce. Many clinical teams are unaware how they perform when compared with other trusts in England. Individual performance metrics are not collected systematically for the vast majority. Newer specialisms, such as obesity surgery, are leading the way with more individual performance data. Long term results are so important in abdominal wall reconstruction but they are almost completely unknown.

We know that general surgery has some major problems, but we also know that none of these problems are so big that they cannot be resolved with the resourcefulness and dedication of our colleagues within the NHS.

Investing in the transformation of provider services has the potential to generate huge gains which in turn, can make trusts more sustainable in the longer term as well as improving care for patients.

A recent Commons debate called for the wider use of clinical data and trials to improve services and outcomes. High quality data enables clinicians and managers to redesign their services for the benefit of their patients.

Much of what we do measure currently is politically derived and risks being counter-productive. We measure how many deaths occur at the hand of a surgeon, but we do not celebrate how many lives they save and improve. We measure how quickly patients receive an operation, but not the success of those operations or alternative treatments. Politically derived measures do not always help improve our service or our skills, nor do they necessarily lead to better outcomes for patients.

There is, however, much we could measure that would make a difference: surgical performance; the number of urgent - if not emergency - patients who receive care

within a given time; readmissions and infection rates. Linking such data to the different procedural approaches used, we can truly understand what the safest and most effective procedures are in NHS practice rather than clinical trials.

Building that next level of insight is our goal and that is why the GIRFT programme supports this CAWR. The NHS RightCare scenario methodology (that this work is based upon) is a very powerful mechanism to share insights. Combining surgeons' knowledge with English Hospital Episode Statistics (HES) data and patient personal experience across a journey of suboptimal and optimal pathways is an engaging way to highlight important drivers of suboptimal outcomes.

My hope is that GIRFT will stimulate the development of many initiatives such as this report, providing the impetus for clinicians, managers and programmes such as ours to work together, creating solutions and improvements that for too long have seemed impossible to deliver.

John Abercrombie

John Abercrombie MB BS FRCS
General surgery, Clinical Lead for Getting It Right First Time (GIRFT)
NHS England National Programme

Mr Dominic Slade, Consultant General & Colorectal Surgeon at Salford Royal Hospital, has also given his support to this work as you can see in this short video.

Analysis Style

NHS RightCare has developed a series of long term conditions scenarios using this style of analysis where suboptimal and optimal case studies of a fictitious, but realistic, patient are compared and contrasted. The intention is to highlight potential improvement opportunities.

The RightCare work is powerful (and often moving) and as a result the goal is that more stakeholders will take note and take action towards positive change.

The British Hernia Society's aim, like NHS RightCare, is to raise awareness through supporting local health economies (including clinical, commissioning and finance colleagues) to think strategically about designing optimal care for people, in this those with complex hernias.

This scenario has been developed with experts in this specialist field and includes prompts for commissioners to consider when evaluating their local health economy requirements.

For further information please contact: http://www.britishherniasociety.org

The story of Angela's experience of a CAWR care pathway, and how it could be significantly improved

In this scenario – using a fictional patient, Angela – we examine a CAWR care pathway, comparing a sub-optimal clinical scenario against an ideal pathway. At each stage we have modelled the costs of care, not only financial to the local health economy, but also the impact on the patient and their family's experience.

This document is intended to help commissioners and providers understand the implications – both in terms of quality of life and costs – of shifting the care pathway from suboptimal to optimal.

It demonstrates how such changes can help clinicians and commissioners improve the value and outcomes of the care pathway.

Context

Complex abdominal wall defects may be the result of a failed prior attempt at closure, trauma, infection, radiation necrosis, or tumour resection. The problem can be very significant (both financially and on the patient's quality of life) in terms of multiple hernia operations, where one CAWR procedure would be optimal.

The scale of incisional hernias in England is illustrated with HES data from 2017/18 which shows 15,537 inpatient spells (79.5% of these were elective admissions). The corresponding indicative cost in this period (all admissions) was £67.5m (average cost per spell = £4,342 and on average over £340k per CCG).

NB a significant proportion of overall incisional hernia cost is consumed by this CAWR cohort; the top 10% of incisional hernia patients account for 29.6% of total costs. Every spell reduced through GIRFT saves money, but more importantly, a huge amount of patient anxiety and distress.

Introducing Angela

Angela is a 55-year-old taxi driver who lives with her husband, Robert. They are a close-knit family with two grown up children and their families living nearby. In the summer of 2011 Angela had noticed blood coming from her back passage. This made Angela very concerned, but she was so busy with late night shifts she hoped the problem would go away.

Angela's suboptimal journey

In September 2011, Angela decided she really ought to find time to visit her GP. The GP confirmed there was blood in Angela's stool and, therefore, ran some blood tests. The GP suspected colorectal cancer and referred Angela to the local colorectal unit for diagnosis. It was a frightening time for Angela.

The GP explained to Angela that her BMI was 33 which put her in the obese category. In addition, the tests found that she had mild anaemia and increased levels of HbA1c, which indicated that she had Type II diabetes. The GP organised another appointment before the colonoscopy to discuss her results further and talk about any worries she may have about the upcoming procedure.

Angela had her colonoscopy at the local hospital in mid-September and the team immediately referred her for an MRI and CT scan. The next day Angela went in again with Robert for support to discuss the results. Together with the consultant, Mr Abrams, and Jane, a colorectal nurse specialist, Angela learnt that she had been diagnosed with a recto-sigmoid tumour and would need surgery to remove the cancer. It was a horrible shock for Angela and she felt very emotional about it. Jane explained that she would be providing ongoing counselling and telephone support should Angela need this.

Angela had her operation in mid-October 2011. This primary surgery was a laparoscopic high anterior resection which was converted to an open, midline incision to remove the bulky tumour. The abdominal wall was closed using a large bite, large suture, mass technique. It all went to plan and after a week of recovery and physiotherapy on the ward she was able to go home. It wasn't all plain sailing though; Angela's wound was weeping and inflamed due to an MRSA infection, so for three weeks a district nurse came in every three days to dress the wound until things healed up. However, it was rarely the same nurse who came to see Angela, which made the whole process more difficult.

At the end of April 2012, Angela had her six-month follow-up appointment at the clinic with Jane and a registrar doctor. Angela explained that she had a slight lump in her tummy but said she was still working and it wasn't really bothering her. The doctor was concerned about Angela's general health; her HbA1c levels were still elevated and Angela was also smoking. He asked her to try to cut down on her smoking and to follow a healthier diet to control her diabetes.

Four months later, Angela went to her GP complaining of discomfort in her tummy; she said it was still bulging and unattractive and that there was a dragging sensation. She explained that it hurt when she did the vacuuming or walked to the shop at the end of the road and that it had become a real issue. The GP advised Angela to mention this to her surgeon as her 12 month follow up was coming up. Two weeks later Angela had a CT scan as well as blood tests ahead of her 12-month colon cancer follow-up appointment.

Angela felt really agitated not knowing what was happening. She was putting on weight sitting in a chair all day and felt that she couldn't do anything or go anywhere. She was afraid that if she did do anything she would make matters worse. By this point she felt like she looked six months pregnant. She was uncomfortable, couldn't walk far, couldn't sit properly and had a heavy, dragging sensation when she was upright. The result was that she felt under a lot of emotional stress.

Robert noticed that Angela now had to sleep wedged in by cushions but that she kept waking up (along with Robert) trying to get comfortable. Robert was getting annoyed. He was almost as unhappy as Angela and certainly not enjoying his retirement. Everything was in limbo. He did all the driving and lifting (Angela couldn't stand the idea of driving when not working now) and felt that she had become an invalid. The emotional stress for them both of waiting for the appointment was awful: waiting, wondering.

Angela attended her 12-month follow-up appointment with her consultant, Mr Abrams, in mid-September 2012. The CT scan showed that she was cancer free which was wonderful news; but Mr Abrams was concerned about Angela's smoking and diabetes, in addition to her weight gain. He listened to Angela's complaints of the growing abdominal bulge that was affecting her life significantly. Angela had been working less because of the discomfort in her tummy and had been feeling very low because she was struggling to get out much. Mr Abrams diagnosed her with a hernia at the site of her surgical scar which was also evident on the CT scan. He

suggested that since she was currently overweight, continued to smoke and her blood sugar control was not optimal, it would be a good idea for her to try doing activities that would get her fitter. He would review her in a few months to see if she was in a better condition to undergo surgery to repair her symptomatic incisional hernia. However, despite his recommendations, Mr Abrams gave no clear direction about enrolment on a weight management programme or smoking cessation course, or what she should do about her diabetes.

A few weeks later Angela went back to see her GP. There was a strange sore area on the lump in the middle of her scar. The GP said it was ringworm, but Angela thought it was where the lump was getting rubbed and sore. Angela felt that her GP did not hold enough awareness of the condition to advise her on its management. She decided to raise it again with Mr Abrams at her next clinic review.

A few months later at her review appointment Angela discussed her tummy bulge with Mr Abrams again. The consultant confirmed that she had an eight-centimetre hernia where her scar was. He explained that her organs were 'hanging out', and that the muscles down the front of Angela's abdomen were now no longer knitted together. After discussing the surgical options, Angela chose a laparoscopic operation because she wanted to get back to work quickly. She had been having financial problems due to doing fewer shifts and this was a real concern for her.

Angela went into hospital in November 2012 for her operation. Mr Abrams performed a laparoscopic repair of the incisional hernia, where the mesh was placed IPOM[1] without closure of the defect. Six weeks later, at her follow-up appointment, she only had a little pain and was fairly mobile. Angela had a new lease of life and, feeling positive, went back to work just after Easter 2013.

However, by August 2013, Angela was back at her GP because she was suffering from abdominal discomfort. She noticed the pain after helping a wheelchair user out of the taxi. She was fed up and demanded to see the GP again a week later because she was still concerned about it. The GP told Angela to discuss this with her consultant at the next follow-up and prescribed her some pain medication in the meantime.

In October 2013 Angela had her two-year follow-up in the cancer clinic with Jane. Jane could see that the bulge had returned and, because Mr Abrams was very busy, Jane referred Angela to the locum surgeon, Mr Jones, for a new appointment. Angela was very worried and uncomfortable. Two weeks later, she was back at her GP. The ongoing abdominal discomfort was really getting to her and her husband

[1]Intraperitoneal Onlay Mesh (IPOM) is a method that involves intraperitoneal placement of mesh in laparoscopic surgery of hernias the placement of mesh directly onto peritoneum overlapping the hernia.

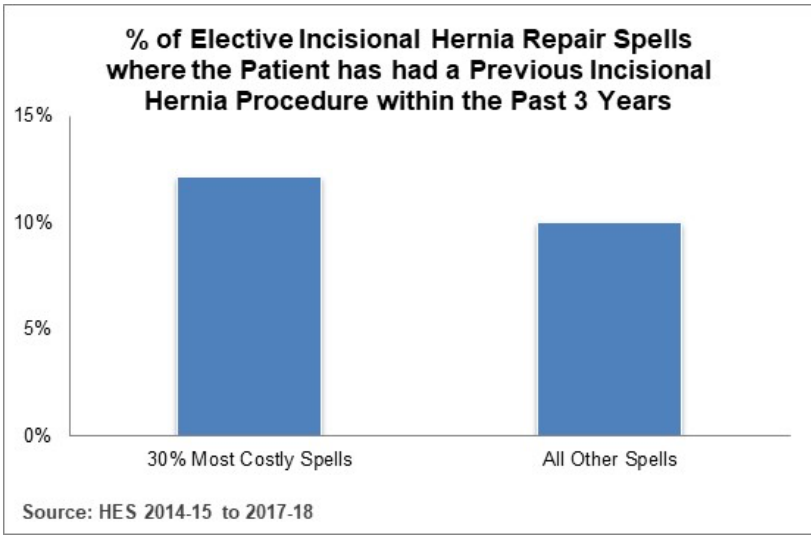
had persuaded her to go because, as she was so irritable, she was becoming difficult to live with.

During December 2013 Angela had a CT scan and later that month she saw the surgeon Mr Jones in clinic following the referral from her specialist nurse. Angela showed him what was now a large bulge and Mr Jones confirmed there was indeed a large defect which needed another surgery.

Angela couldn't bear it. It felt like the saga would never end. She thought she needed to deal with the uncertainty while she waited for her next operation and not put her life on hold. She went on a short budget holiday with Robert – it was all they could afford with money being so tight now.

Angela had a second hernia operation in March 2014 to correct the problem – this time using a revisional open hernia repair with a synthetic mesh. The surgeon found it difficult to completely close the muscles in the midline. Angela stayed in hospital for eight days in total (four days longer than the expected trim-point as a second course of antibiotics was required). When she went back home after discharge a district nurse visited her every three days for the three weeks before her surgical clinic review. However, it was rarely the same nurse who came to see Angela, which she thought made it harder for them to keep tabs on her condition and made it difficult for her to be honest about how she was feeling. During that time Angela became low and visited her GP to talk about it. Her GP agreed that she was depressed and prescribed antidepressants.

Chart 1: % Patients that have multiple incisional hernia procedures[2]



For all patients that had an elective incisional hernia repair spell in 2016-17, 10.6% have previously had another incisional hernia procedure within the last 3 years.

For patients in the 30% most costly spells, this rises to 12.1% compared to 10% for all other patients.

In late April 2014 Angela went for her follow-up appointment. Her wound had not healed, and she hadn't been able to get back to work. She explained that she was permanently uncomfortable and was feeling very low. Mr Jones booked her in for an appointment another six weeks later to see if the wound had healed. In the meantime, Angela felt really frightened about doing something that would trigger a lot of pain. She felt like she had become an invalid and would just watch television in a chair all day. She cancelled everything and was simply waiting to see what would happen to her. Angela felt very uncertain, she was physically unable to do much to help herself.

The district nurse continued to visit Angela every few days. In June 2014 the nurse became concerned and so took a swab of the wound. At Angela's three month follow up appointment with Mr Jones they discussed her wound problems and the results of the swab which showed mixed skin bacterial organisms. They also talked about her BMI still being high, her smoking, and her uncontrolled diabetes, all of which contributed to her delayed wound healing. Due to her reduced mobility Angela still had not returned to work. Furthermore, she was depressed, and her relationship with Robert had become increasingly strained. Mr Jones decided to see Angela in three months to see how she was doing and suggested that she quit smoking, control her diabetes better and lose weight to allow the wound to heal. He considered referring Angela to a different surgeon who specialised in abdominal wall repair.

When Angela went back for her next appointment she had not been able to stop smoking, her weight had increased and so had her Hba1c levels. She explained that

[2] Secondary care data is taken from the English Hospital Episode Statistics (HES) database produced by NHS Digital, the new trading name for the Health and Social Care Information Centre (HSCIC)

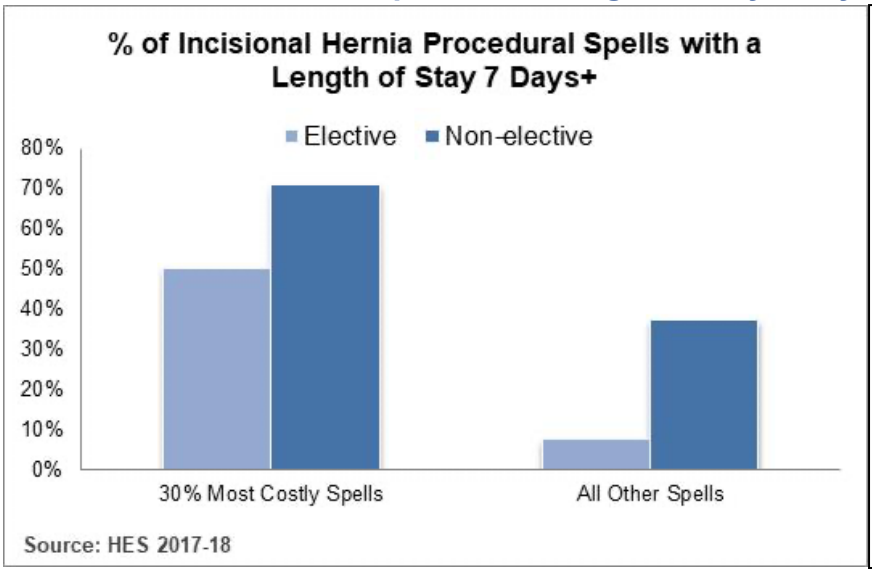
she was still not working, was experiencing severe financial difficulties and was struggling with her depression. Mr Jones referred Angela to Mr Hodgkinson, a colorectal surgeon at the same hospital, who also had an interest in hernia surgery.

Mr Hodgkinson saw Angela and, on examination, noted a definitive abdominal wall defect of at least 10 cm in width, with mesh visible in the base of the open wound. It required further surgery. Angela felt very upset that she would need yet another operation, and about how sedentary her lifestyle had become, which meant she was not working and was piling on weight. Angela asked Mr Hodgkinson for surgery, so she could get back to the life she had before the cancer. Mr Hodgkinson agreed to do the surgery, although he asked her to try to quit smoking and lose some weight.

While Angela waited for the surgery, the district nurse was visiting every three days to deal with her wound. The wound caused a great amount of discomfort and drastically affected Angela's quality of life.

In November 2014 Angela had a major abdominal wall repair operation but the surgeon was unable to achieve fascial closure, defaulting to a bridging approach without component separation. She stayed in hospital for 22 days, 10 of which were in intensive care.

Chart 2: Incisional hernia procedure length of stay analysis:[3]



Within the 30% most costly incisional hernia procedural spells, 50% of elective and 71% of non-elective spells have a length of stay 7 days or above. For all other spells, only 7% and 37% exceed 7 days respectively.

Angela was discharged home but never became fit enough to work again. Incapacity may have also lowered her life expectancy. Even though she finally got to the right place and was seen by the right specialist surgeon, the damage was already done. The patchwork of previous attempts made a successful repair impossible, despite the expense of a long and complex operation. Angela's hernia would now always be a problem, making walking and sitting almost impossible. Lying down was the only way she could get comfortable and, even then, she would get intense spasmodic pains which overwhelmed her until it subsided.

This was a devastating outcome for Angela. She loved her work and was looking forward to an active retirement spending time with her grandchildren and travelling with Robert. Now the future would be very different. Sadly, this suboptimal experience is not an isolated occurrence for NHS patients like Angela in the NHS.

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Questions for clinicians and commissioners to consider

At the CCG population level, we estimate that there are around 4,500 patients[4] in England living with CAWR symptoms and many will not have been identified formally as requiring CAWR specialised treatment.

In the local health economy, who has overall responsibility for:

- Raising awareness that CAWR is a problem that requires recognition and targeted interventions with specialist referrals at an early stage of the pathway?
- Getting agreement (in line with GIRFT recommendations) between trusts and commissioners that CAWR represents good value for certain patients?
- Training and education with respect to evidence-based clinical selection criteria and optimal procedural approach/ technique?
- Agreeing fair compensation to trusts for these specialised treatments (acknowledging that current HRG payments for CAWR do not come close to current financial outlay trusts make for CAWR surgical intervention)?
- Monitoring specialist referrals (timeliness and outcomes) and the number of secondary hernia operations where specialist referrals were not made?
- Ensuring individuals with CAWR problems are educated and supported in their condition and facilitated to appropriately self-manage symptoms to optimise their health and wellbeing?
- Monitoring quality assurance and value for money in CAWR care?
- Understanding whether the health economy already has valuable local data around patient experience and outcomes for CAWR care in the area?
- Understanding how this local data could be used to identify and drive improvements? [5]

The above questions are vital in understanding who manages which components of the whole pathway. Most importantly, it is impossible to effect optimal improvement if the system is not aware of the answers.

[4] 4,484 incisional hernia patients in the top 3 deciles (most complex) in 17/18 HES data
[5] If you require advice and resources around engagement, please contact 'The Involvement Hub' through this link: https://www.england.nhs.uk/participation/

What could have been done better?

Angela's optimal pathway

Angela is a 55-year-old taxi driver who lives with her husband, Robert. They are a close-knit family with two grown up children and their families living nearby. In the summer of 2011, Angela had noticed blood coming from her back passage. She knew that could be serious – she remembered seeing a poster at the GP surgery which was part of the CCG's campaign on bowel health – so she went straight in to get it checked out.

The GP confirmed there was blood in Angela's stool using a FIT (faecal immunochemical test) and ran some blood tests. The GP suspected colorectal cancer and referred Angela to the local colorectal unit for diagnosis. It was a frightening time for Angela.

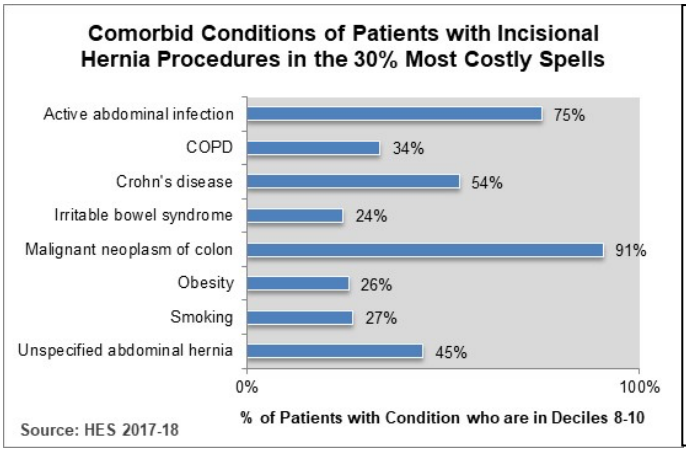
The GP explained to Angela that her BMI was 33 which put her in the obese category, and in addition, the tests found that she had mild anaemia and increased levels of HbA1c, which indicated she had Type II diabetes. The GP organised another appointment before the colonoscopy so that they could discuss these results further and talk about the next steps and any worries she may have about the upcoming procedure.

Angela had her colonoscopy at the local hospital in early August 2011 and the team immediately referred her for an MRI and CT scan. In turn, Angela provided blood samples to have the staging of her suspected cancer confirmed. Once her imaging and pathology results came back, Angela's GP was informed, and an outpatient appointment was sent to Angela to meet her consultant, Mr Abrams, along with the colorectal nurse specialist, Jane.

Angela attended this clinic with her husband and was informed that she had developed a recto-sigmoid tumour and would need surgery to remove the cancer. It was a horrible shock for Angela and she felt very emotional about it. Jane explained that she would be providing ongoing counselling and telephone support if Angela needed anything at all.

They also discussed health awareness and the steps that Angela could take in relation to her lifestyle to maximise her chances of the surgery being a success. These included weight management strategies and a cardiopulmonary assessment. To give Angela the best chance of a successful surgical result, Mr Abrams recommended that in addition to losing weight, that she could try to control her diabetes through healthier food choices (handing her a booklet produced by the local diabetes association called *Eating to treat diabetes*). He also referred her for a smoking cessation course.

Chart 3: Most prevalent comorbid conditions of incisional hernia patients[6]



Within the 30% most costly incisional hernia procedural spells, 26% of patients have been diagnosed with obesity and 27% have been diagnosed with smoking/tobacco use.

Angela took part in a nurse-led smoking cessation course. She also enrolled in a weight management programme because, following the advice offered during her consultation, Angela was motivated to do everything she could to lose weight to improve her chance of a good outcome.

In September 2011 Angela had an open midline incision to remove the tumour which went to plan. As part of the colorectal ward's early mobilisation strategy, Angela was able to go home after a week of recovery and physiotherapy. It wasn't all plain sailing though; Angela's wound was weeping and inflamed due to an MRSA infection, so for three weeks a district nurse came in every three days to dress it until it healed up.

In early April 2012 Angela had her six-month follow-up appointment at the clinic with her colorectal nurse specialist and a registrar doctor. Angela explained that she had a slight lump in her tummy but said that she was still working and that it wasn't really bothering her. The doctor expressed concern as he had undertaken a specialist training course in hernia management so was aware there may be complications. He said if it became more pronounced she would be referred to see a hernia specialist. The registrar was also concerned about her HbA1c levels, which were still elevated,

[6] Secondary care data is taken from the English Hospital Episode Statistics (HES) database produced by NHS Digital, the new trading name for the Health and Social Care Information Centre (HSCIC)

and that Angela was smoking, although she had managed to cut down due to the support from the clinic.

As time passed by Angela felt worried as she was uncomfortable due to her swollen tummy and she was struggling to walk far or sleep well. She couldn't even sit properly in a chair, and had a heavy, dragging sensation when she was upright. These symptoms put a lot of emotional stress on Angela, but she was getting a lot of support from her GP who reassured her that it was safe to keep active and that any exercise she could do would help her physical condition and improve her psychological wellbeing too.

Four months later Angela went back to her GP complaining of discomfort in her tummy; she said it was still bulging and unattractive and that there was a dragging sensation. She explained that it hurt when she did the vacuuming or walked to the shop at the end of the road and that it had become a real issue. The GP then wrote to the surgeon ahead of Angela's 12 month follow up to alert him to the fact that Angela was experiencing problems. A few weeks later Angela had a CT scan as well as a blood test ahead of her colon cancer follow-up appointment.

Angela attended her 12-month follow-up appointment with Mr Abrams in mid-September, when she got her test results. She was still cancer free, which was wonderful news, and Mr Abrams was pleased to see that Angela had now stopped smoking and lost some weight. Day to day Angela had been working less because of the discomfort in her tummy, and had been feeling very low because she was struggling to get out. Mr Abrams discussed the CT scan with Angela, who complained of the growing bulge that was affecting her significantly. He explained that the CT scan showed a hernia at the site of her surgical scar with a defect size of eight centimetres in width. He was aware that in view of the size of the hernia, and in addition to her comorbidities, this required specialist intervention. He referred Angela to Mr Latham, a surgeon in a nearby hospital, who had a specialist abdominal wall repair (AWR) practice.

In April 2013 Mr Latham confirmed that, although the hernia was an eight-centimetre defect with 'loss of domain' (more than 25% of the abdominal cavity contents lying in the hernia), he was satisfied with the improvement in her comorbidities and that the risks associated with her having CAWR surgery were much reduced. Through her own efforts and the support she had received, Angela had stopped smoking, her HbA1C was just above the upper limit of normal, and she had managed to lose a considerable amount of weight. Mr Latham demonstrated to her, using the CeDAR (Carolina's Equation for Determining Associated Risk) app, that she had successfully

addressed her reversible risk factors, such that she was now in much better shape for surgery.

In May 2013 Angela had Botox treatment[7] as well as swabs for MRSA colonisation ahead of her operation, booked for late June 2013. At surgery she had an open approach with posterior component separation, achieving primary fascial closure with minimal tension. The repair was supported with an appropriate large mesh, placed in the retrorectus plane. Post anaesthetic recovery Angela went to the high dependency unit, where an enhanced recovery after surgery (ERAS) protocol was followed. After two days in a high dependency unit (HDU) she was stepped down to a surgical ward with continuation of her ERAS protocol. Angela's drains were removed by the fifth day post-surgery.

In October 2013 Angela returned for a follow up appointment with her surgeon. Her abdominal wall repair was assessed, and her wound was judged to be well healed. Further advice on weight control, diet, and physical activity was given, and she was discharged from further surgical review.

The outcome for Angela in this optimal scenario is better on all fronts. She underwent fewer surgeries and her total time of enduring ill health was much shorter. Vitally for Angela, she did not have three hernia operations which all failed, and she did not have to suffer the awful wound that arose in the suboptimal scenario. Most importantly however, at the end of the treatment, Angela was in good health and could go back to work. She continues to enjoy a happy and productive work life and the prospect of retirement ahead of her, with no long-term ill effects from this episode. She continues her follow up with her colorectal surgeon.

This is very different from the suboptimal scenario where Angela suffers ongoing physical, psychological and financial hardship. The suboptimal scenario is currently considered the 'normal' route that most patients like Angela currently experience in the NHS.

[7] The injection of Botox into the lateral abdominal wall muscles is being increasingly used to cause a temporary paralysis of these muscles, thus enlarging the abdominal cavity volume and reducing the degree of loss of domain.

Call to action - NHS CAWR Management:

I) Patient selection criteria - 'who do we mean?' Leveraging hernia expert leadership NHS triage system for management of incisional hernia build on VHWG criteria (Ventral Hernia Algorithm from the Danish Hernia Registry): Evidence based pathway that risk stratifies patients into 'defined groups /cohorts' based on patient-related and hernia-related risk factors.

a) Site specification criteria - 'who should provide this service?'. NHS triage system should specify the most appropriate level of hernia expertise within a surgical unit to treat these patients to provide optimal management. Appropriate training with an emphasis on preoperative patient assessment and optimisation of risk factors prior to surgery, taking a multi-disciplinary approach.

b) NHS Tariff 'shortfall' for CAWR - 'who should engage NHS Digital (c/o NHSI)?' to highlight the current significant inadequate level of funding offered for a standard CAWR.

c) Consider adoption of EHS registry to serve as a national hernia database. Prospective data collation would stimulate interest and focus surgeons on improving post-operative outcomes and operative technique at their participating NHS centre.

Treatment and care costs, how they compare

For the financial evaluation we performed a detailed analysis through mapping the lifecycle of the pathways. Through this process we were able to identify the cost drivers that would be incurred in primary, community and hospital care, using NHS reference costs and, where there is a hospital stay, average cost per bed day[8] .

This scenario uses a fictional patient, Angela. It is intended to help commissioners and providers understand the implications (both in terms of quality of life and financial costs) of shifting the care pathway of people living with CAWR problems

[8] The £400 per bed day cost is an estimate of cost for the cohort considered to calculate the approximate costs of a single day's treatment in a ward in a hospital setting. This value has been derived from 2015/16 SUS data using the weighted bed-day cost with Market Forces Factor applied for age ranges between 40-74. This is consistent across the whole suite of these RightCare scenarios. The average cost per patient day in 11 ICUs was £1,000 https://www.gov.uk/government/publications/nhs-reference-costs-2015-to-2016 This is consistent across the whole suite of these RightCare scenarios.

from a reactive to a proactive treatment approach. The financial costs are indicative and calculated on a cost per patient basis. Local decisions to transform care pathways would need to take a population view of costs and improvement.

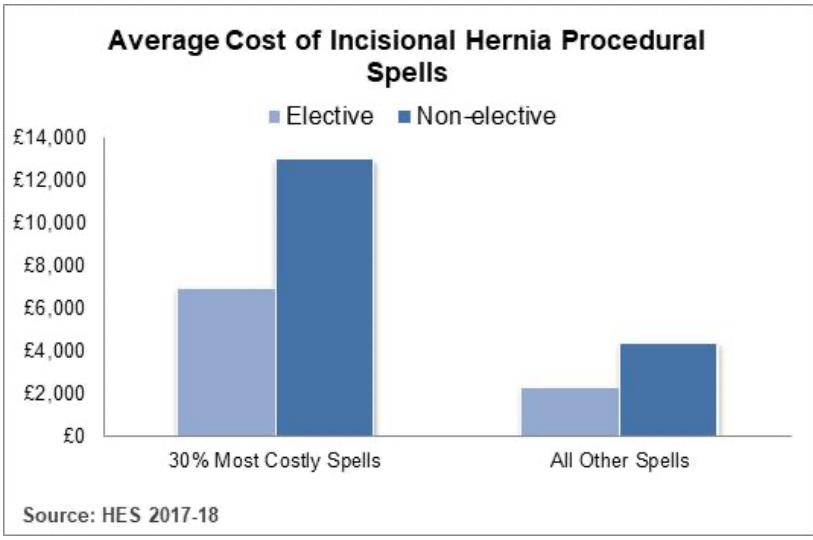
Table 1: Comparison of the two scenarios by cost category

Analysis by cost category	Sub-optimal	Optimal	Optimal %
Primary care management	£673	£951	141%
Secondary care management	£42,971	£25,273	59%
Community care management	£2,290	£0	0%
Grand total	**£45,934**	**£26,224**	**57%**

This estimated £20,000 saving (for one patient) over the pathway of care is driven by three primary variables:

i. **Number of operations:** The suboptimal case has four operations compared to only two in the optimal (including two extra "standard" hernia operations which are inappropriate)
ii. **Wound care:** After the second standard hernia operation (suboptimal) Angela suffers from a serious wound which requires over ten months of community care with a district nurse that is not required in the optimal case. (The greater the number of operations, the greater the risk of complications.)
iii. **Primary care costs:** There is a 41% increase in investment in primary care to support Angela with comorbidities to reduce risks associated with obesity and smoking. (NB this investment is significantly offset considering that the number of GP visits is 13 in the suboptimal case compared to only three in the optimal case.)

Chart 4 – Average cost of incisional hernia procedural spells[9]



This chart shows the average cost of inpatient spells where an incisional hernia procedure has been carried out in 2016-17. The average cost for the 30% most costly spells is £6,976 for elective spells and £13,031 for non-elective spells. This compares with £2,303 (elective) and £4,397 (non-elective) for the other 70% of incisional hernia spells. ***Note these costs represent HRG payments and not necessarily the costs to trusts.***

Having applied NHS RightCare methodology to the economic modelling for this case, Healthcare Resource Group (HRG) costs for surgical procedures have been used. However, the consistent view from all clinicians who have engaged with this scenario is that CAWR specialist episodes take a lot more theatre and post operation time than standard procedures and therefore the HRG payments do not cover the trust's costs. Due to this a zero-based budget approach was undertaken to illustrate this significant shortfall, as per Table 2 below.

[9] Secondary care data is taken from the English Hospital Episode Statistics (HES) database produced by NHS Digital, the new trading name for the Health and Social Care Information Centre (HSCIC)

Table 2: Analysis of the final specialist CAWR surgical episode for Angela[10]:

Analysis of final CAWR Operation	Sub-optimal £s	Optimal £s	Optimal %
Pay costs	3,380	2,490	74%
Biomesh	4,800	4,800	100%
Consumables	334	334	100%
Drugs	58	58	100%
Operating Theatre	2,880	1,920	67%
Grand total	**11,452**	**9,602**	**84%**
ITU Day Costs	10,000	-	0%
HDU Day Costs	-	1,398	0%
GNW Day Costs	4,800	4,000	83%
Total Episode Costs	**26,252**	**15,000**	**57%**
Standard HRG Compensation (FZ12N)	3,600	3,600	100%
Variance	- 22,652	- 11,400	**50%**

Notes: i) Working on the NHS Institute for Innovation and Improvement paper "The productive operating theatre" that average theatre costs are £1,200 per hour (£480 per hour for non-staff costs). ii) Assuming six hours theatre time for suboptimal and 4 hours optimal. iii) Staff costs include pre-operative, the operation and post-operative recovery time.

Financial summary:

The shift in focus i.e. immediate referral to a specialist in CAWR, represents improved value for money, better use of healthcare resources and, most importantly, a significant improvement in Angela's clinical outcome and quality of life.

This more proactive and appropriate referral approach leads to fewer GP appointments in primary care, significantly less cost in secondary care and fewer district nurse resources from community care.

Note that this estimated financial saving of almost £20,000 in this case can be seen as a conservative value because in the suboptimal scenario Angela has to retire (due to disability) before the age of 60. In the optimal case, Angela would have been expected to continue working for at least an additional five years.

[10] A subset of the total pathway costs as illustrated in Table 1

Financial caveats:

- The financial calculation presented here represents an indicative level of efficiency potential of the case only:

  Firstly, as the case is an example pathway, differential pathways for other patients may increase or reduce the potential benefit.

  Secondly, the potential releasing of resource associated with implementing the optimal pathway across a larger cohort of patients will be subject to an over-arching contractual arrangement between providers and commissioners, which may differ across the country.
- Each healthcare organisation and system will need to assess the potential for realising the financial benefits identified within the case.

Links to other resources

For more information about Complex Abdominal Wound Repair, its detection, management, guidelines and policy you may want to look at the following resources:

I) Classification of primary and incisional abdominal wall hernias:

https://www.ncbi.nlm.nih.gov/pubmed/19495920

II) EuraHS: the development of an international online platform for registration and outcome measurement of ventral abdominal wall hernia repair:

https://www.ncbi.nlm.nih.gov/pubmed/22527930

III) Ventral Hernia Algorithm from the Danish Hernia Registry:

http://www.britishherniasociety.org/ventral-hernia-algorithm-from-the-danish-hernia-registry/

IV) CeDAR: Carolinas Equation for Determining Associated Risks (an App):

https://itunes.apple.com/us/app/cedar-ventral-hernia/id830530974?mt=8

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